

THE INVENTION CLAIMED IS

1. A compact reflective imaging spectrometer apparatus, comprising:
an entrance slit for directing light,
a first means for receiving said light and focusing said light,
an immersed diffraction grating that receives said light from said first means
and defracts said light,
a second means for receiving said light from said immersed diffraction
grating and focusing said light, and
an image plane that receives said light from said second means.
2. The compact imaging spectrometer apparatus of claim 1 wherein said
immersed diffraction grating has a front and a back and including rulings on said
back.
3. The compact imaging spectrometer apparatus of claim 2 wherein said
immersed diffraction grating comprises equally spaced straight grooves.
4. The compact imaging spectrometer apparatus of claim 3 wherein said
immersed diffraction grating has 65 grooves per mm.
5. The compact imaging spectrometer apparatus of claim 1 wherein said
immersed diffraction grating comprises a prism with three angles.
6. The compact imaging spectrometer apparatus of claim 5 wherein said
angles are around 51.7°, 36.2°, and 92.1°.
7. The compact imaging spectrometer apparatus of claim 1 wherein said
immersed diffraction grating comprises a germanium grating.
8. The compact imaging spectrometer apparatus of claim 1 wherein said
first means comprises a collimating lens.
9. The compact imaging spectrometer apparatus of claim 1 wherein said
second means comprises an objective triplet lens.

10. The compact imaging spectrometer apparatus of claim 1 wherein said second means comprises an objective triplet lens and a cold filter.

11. The imaging spectrometer apparatus of claim 1 wherein said imaging spectrometer apparatus has a front and a back and wherein said slit, said first means, said immersed diffraction grating, said second means, and said image plane fit within an envelope located between said front and said back.

12. The imaging spectrometer apparatus of claim 11 wherein said envelope is 8.2 cm by 7.9 cm by 1.4 cm or smaller.

13. The imaging spectrometer apparatus of claim 11 wherein said envelope is 3.4 cm by 1.4 cm by 1.2 cm or smaller.

14. The imaging spectrometer apparatus of claim 1 wherein said image plane comprises a detector.

15. The imaging spectrometer apparatus of claim 1 wherein said image plane comprises a detector array.

16. The imaging spectrometer apparatus of claim 11 wherein said image plane comprises a 2-D detector.

17. The imaging spectrometer apparatus of claim 1 wherein said image plane comprises a 2-D detector array.

18. A compact reflective imaging spectrometer apparatus, comprising:
an entrance slit for directing light,
a first lens means for receiving said light and focusing said light,
an immersed diffraction grating that receives said light from said first lens means and defracts said light,
a second lens means for receiving said light from said immersed diffraction grating and focusing said light, and
a detector that receives said light from said second lens means.

19. The compact imaging spectrometer apparatus of claim 18 wherein said immersed diffraction grating comprises a prism with three angles.

20. The compact imaging spectrometer apparatus of claim 19 wherein said angles are around 51.7°, 36.2°, and 92.1°.

21. The compact imaging spectrometer apparatus of claim 18 wherein said immersed diffraction grating comprises a germanium grating.

22. The imaging spectrometer apparatus of claim 18 wherein said imaging spectrometer apparatus has a front and a back and wherein said slit, said first lens means, said immersed diffraction grating, said second lens means, and said detector fit within an envelope located between said front and said back.

23. The imaging spectrometer apparatus of claim 22 wherein said envelope is 8.2 cm by 7.9 cm by 1.4 cm or smaller.

24. The imaging spectrometer apparatus of claim 22 wherein said envelope is 3.4 cm by 1.4 cm by 1.2 cm or smaller.